

## **REMARKS/ARGUMENTS**

Reconsideration of the application as amended is respectfully requested.

### **Status of Claims**

Claims 1 and 3-19 are pending in the application, with claims 1 and 16-19 being the only independent claims. Claims 1, 3, 10, 16, 17 and 19 have been amended.

### **Overview of the Office Action**

Claim 10 stands objected to because of an informality therein.

Claims 1, 3-7 and 19 stand rejected under 35 U.S.C. 112, second paragraph, because of informalities in claims 1, 3, 16, 17 and 19.

Claims 1, 5-11, 14-17 and 19 stand rejected under 35 U.S.C. 103(a) as unpatentable over JP 60-208495 (*JP '495*) in view of JP 03-027175 (*JP '175*) and DE 2,204,156 (*DE '156*).

**Note:** Although the Examiner mentions *JP '495* in view of *JP '175* and *DE '156* in the formulation for rejecting claims 1, 5, 9 and 11 as unpatentable over prior art, no mention is made of *DE '156* in the detailed explanation of the rejection which applies only *JP '495* in view of *JP '175*. Therefore, claims 1, 5, 9 and 11 are deemed rejected under 35 U.S.C. 103(a) as unpatentable over *JP '495* in view of *JP '175* in this Response.

Claims 3 and 4 stand rejected under 35 U.S.C. 103(a) as unpatentable over *JP '495* in view of *JP '175* and *DE '156* and further in view of U.S. Patent No. 5,591,565 (*Holdermann*).

Claims 12, 13 and 18 stand rejected under 35 U.S.C. 103(a) as unpatentable over *JP '495* in view of *JP '175* and *DE '156* and further in view of DE 2,204,156 (*DE '318*).

### **Amendments Addressing Informalities**

Claims 1, 3, 10, 16, 17 and 19 have been amended to eliminate the informalities listed on pages 4 and 5 of the Office Action.

In view of the self-explanatory amendments, withdrawal of the objection to claim 10 and withdrawal of the rejection under 35 U.S.C. 112, second paragraph, of claims 1, 3-7 and 19 are respectfully requested.

### **Summary of Subject Matter Disclosed in the Specification**

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The specification discloses a method of applying a metal coating to graphite. An embodiment of the method includes the steps of anodic etching the graphite in an alkaline etchant, Pd seeding the graphite, and electroplating the graphite with the metal. See paragraphs [0007], [0008] and [0012] of the specification.

The anodic etching cleanses and slightly etches the graphite surface. In other words, after the anodic etching, the graphite surface is not only essentially free of foreign impurities, but also slightly roughened. As a result, the metal coating can effectively interlock with the graphite surface, and accordingly has a high adhesive strength and temperature stability. See paragraph [0007] of the specification.

The alkaline etchant preferably is a solution of at least one of NaOH and KOH having a concentration in the range of 10 to 70% by weight. See paragraph [0016] of the specification.

The duration of the anodic etching is preferably in the range of 5 to 90 minutes. See paragraph [0015] of the specification.

### **Descriptive Summary of the Prior Art**

#### *JP '495*

*JP '495* relates to a pretreatment of a carbon material so that the carbon material can be simply and easily electroplated at a low cost. See abstract of *JP '495*. The carbon material consists of carbon fibers, etc. The pretreatment includes the step of applying a thin film of noble metal to the surface of the carbon material. If the surface of the carbon material is not clean enough, the carbon material is first subject to a cleaning treatment such as degreasing, rinsing and/or soft etching by a caustic alkali. See abstract of *JP '495*.

#### *JP '175*

*JP '175* relates to a method of making carbon fiber from a polyacrylonitrile-based or pitch-based substance. See abstract of *JP '175*. The method includes the step of anodic etching a carbonized fiber in an aqueous solution of an electrolyte. After this step, the fiber is calcined in an inert atmosphere to remove low oriented parts so that the carbon fiber has high orientation properties and excellent tensile strength. See abstract of *JP '175*.

#### *DE '156*

*DE '156* relates to a process for oxidatively treating the surface of continuous carbon filaments. See col. 1, lines 9-14 of GB 1,371,621 which is a counterpart of *DE '156*.

## Arguments

### Independent Claim 1

When rejecting claim 1 under 35 U.S.C. 103(a), the Examiner acknowledges that *JP '495* does not disclose anodic etching, nor that graphite is the material to be electroplated, as specifically recited in claim 1 of the present application.

To bridge the first “gap”, the Examiner modifies *JP '495* by replacing the soft etching of *JP '495* with the anodic etching of *JP '175*. To bridge the second “gap”, the Examiner further modifies *JP '495* by replacing carbon fibers with graphite.

Applicant respectfully submits that claim 1 is patentable over *JP '495* in view of *JP '175* for the reasons that:

(A) *JP '175* cannot be used to modify *JP '495* because *JP '175* is nonanalogous prior art, and

(B) even if *JP '175* were analogous prior art, there is no suggestion or motivation

(1) to modify *JP '495* by replacing the soft etching of *JP '495* with the anodic etching of *JP '175*, and

(2) to further modify the *JP '495* by replacing carbon fibers with graphite.

#### *(A) JP '175 Is Nonanalogous Prior Art*

As discussed earlier, *JP '175* relates to carbon fiber making. In *JP '175*, after the anodic etching treatment, the carbonized fiber is calcined in an inert atmosphere to remove low oriented parts so that the carbon fiber has high orientation properties and excellent tensile strength. No metal coating or electroplating is contemplated in *JP '175*.

In sharp contrast, the claimed invention relates to applying a metal coating to graphite by electroplating. The goal is to substantially improve the adhesion between the metal coating and the graphite. Since carbon fiber making is neither in the field of applicant's endeavor (applying a metal coating to graphite) nor reasonably pertinent to the particular problem (low adhesive strength and low temperature stability of the metal coating) with which the inventor was concerned, applicant respectfully submits that JP '175 is nonanalogous prior art, and that as a result JP '175 cannot be used to modify JP '495. If the Examiner is of a contrary opinion, then the Examiner is respectfully requested to provide a thorough explanation as a basis for such view in full compliance with PTO requirements on this issue.

*(B)(1) No Suggestion or Motivation to Replace the Soft Etching of JP '495 with the Anodic Etching of JP '175*

Even if JP '175 were analogous prior art, there is no suggestion or motivation to modify JP '495 by replacing the soft etching of JP '495 with the anodic etching of JP '175.

As discussed earlier, in JP '495, the soft etching is used to clean the surface of the carbon material. In JP '495, the carbon material is already made, and the soft etching does not improve the high orientation properties or tensile strength of the carbon material.

On the other hand, in JP '175, the anodic etching is used "because anodizing the surface of carbonized or graphitized carbon fibers would have provided carbon fibers with high orientation and tensile strength" (see page 6 of the Office Action). Thus, according to the Examiner, in JP '175, the anodic etching is used to improve the high orientation properties and tensile strength of the resulting carbon fibers during the carbon fiber making process.

Since the soft etching of JP '495 is used for cleaning the carbon material while the anodic etching of JP '175 is used for improving the high orientation properties and tensile strength of the resulting carbon fibers, contrary to the Examiner's interpretation, a person having ordinary skill in the art would not be motivated to replace the soft etching of JP '495 with the anodic etching of JP '175.

This is especially true when it is realized that JP '495 also discloses other cleaning treatments such as degreasing, rinsing, and further states that the cleaning treatment can be omitted if the surface of the carbon material is sufficiently clean. *See* abstract of JP '495.

*(B)(2) No Suggestion or Motivation to Replace the Carbon Fibers of JP '495 with Graphite*

It is noted that both JP '495 and JP '175 deal with carbon fibers, not graphite. JP '175 uses the expression "graphitized yarn". This is not a precise expression. What is meant is that carbon fibers are usually made by first producing synthetic fibers (melt spinning), and then by "carbonizing" the synthetic fibers (i.e., by expelling hydrogen and oxygen so that only carbon is left). It does not make the yarn into graphite.

Carbon fibers and graphite are two different materials. Carbon fibers are man-made. Graphite occurs in nature. Carbon fibers are special modifications in the form of very thin fibers of a diameter of some micron. Graphite is a two-dimensionally crystalline modification of carbon and a bulk material. Carbon fibers have an enormous tensile strength. Therefore, carbon fibers are usually used in high-performance vehicles, sporting equipment, and other demanding mechanical applications. Graphite, on the other hand, is one of the softest materials on earth. Therefore, graphite is usually used as a lubricant, for example.

In view of these differences between graphite and carbon fibers, contrary to the Examiner's interpretation, a person having ordinary skill in the art would not be motivated to modify *JP '495* by replacing the carbon fibers of *JP '495* with graphite.

The fact that something can be done is an insufficient basis to obviate an invention. Absent a motivation, the references can be modified and/or combined in the way proposed in the Office Action only with impermissible hindsight based on the claimed invention.

#### Dependent Claims 3-15

Claims 3-15 depend, either directly or indirectly, from independent claim 1 and, thus, each is allowable therewith.

In addition, these claims include features which serve to even more clearly distinguish the present invention over the prior art of record.

In particular, it is respectfully submitted that the Examiner has not made a *prima facie* case against claims 9 and 14. In order to establish a *prima facie* case with respect to a claimed range, an Examiner is required to find a prior art value that is either within or at least very close to the claimed range. See MPEP 2144.05(I) and (II).

In this Office Action, with respect to the current duration range recited in claim 9, the Examiner merely states that the electroplating of *JP '495* inherently has a current duration without pointing out a specific value. Similarly, with respect to the electrical potential range recited in claim 14, the Examiner merely states that the anodic etching of *JP '175* inherently has an electrical potential without pointing out a specific value. Thus, the Examiner does not even specify a prior art value, not to mention a prior art value that is either within or at least very close to the claimed range.

It is noted that the Examiner withdrew her previous rejections of claims 16 and 19 in view of applicant's argument that the claimed range neither overlaps or lies inside the prior art range, nor is close enough to the prior art range. Applicant does not see how the current 35 U.S.C. 103 rejection of claims 9 and 14 can be sustained when the Examiner does not even specify a value.

#### Independent Claims 16-19

Each of independent claims 16-19 is patentable for reasons discussed above in connection with claim 1.

In addition, independent claim 19 is also patentable for reasons discussed above in connection with claims 9 and 14.

#### Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

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